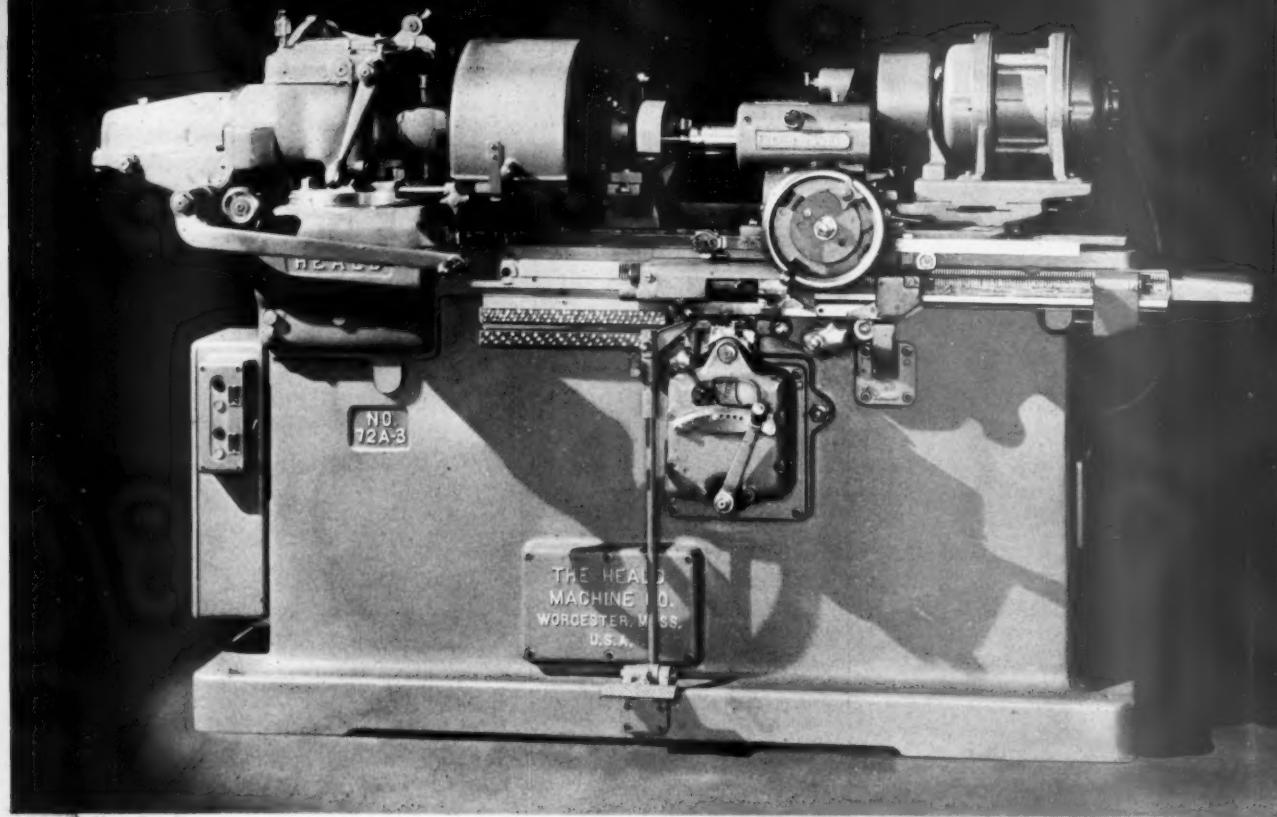


The Tool Engineer



AMERICAN SOCIETY OF TOOL ENGINEERS

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for SMALL LOTS and TOOL ROOM WORK

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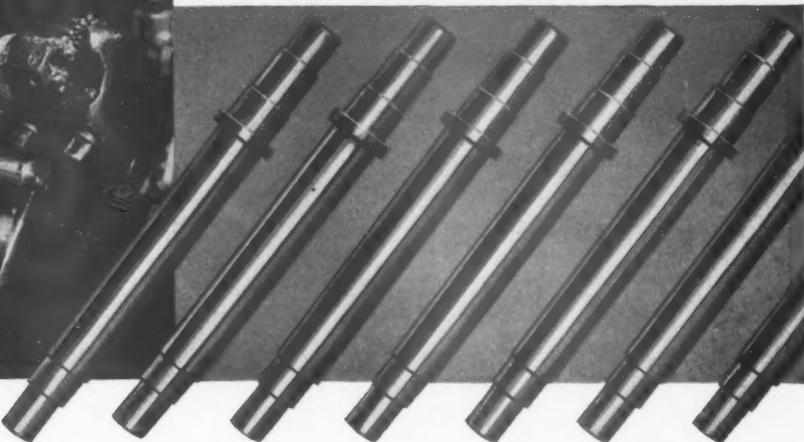
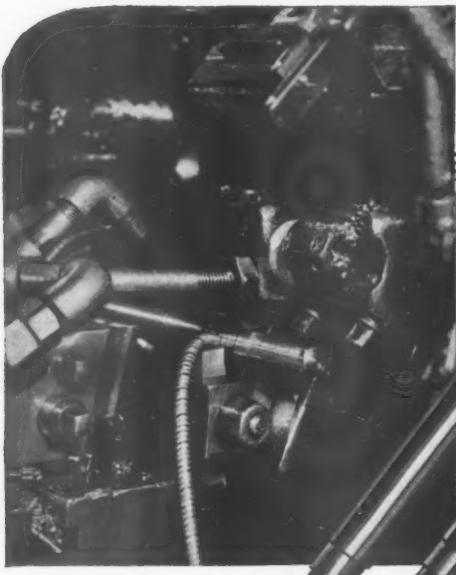
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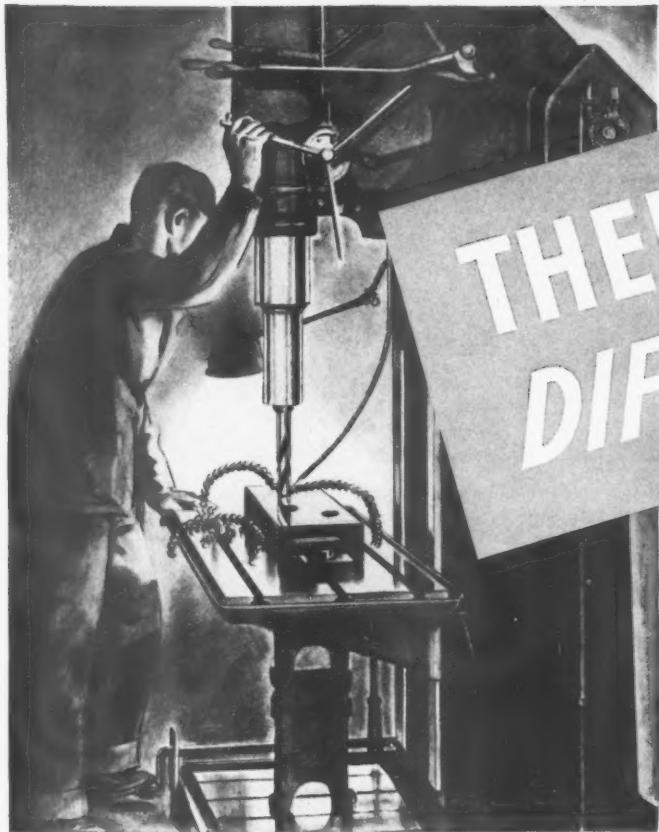
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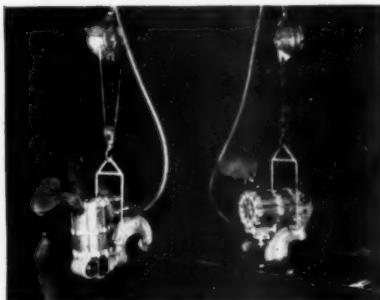


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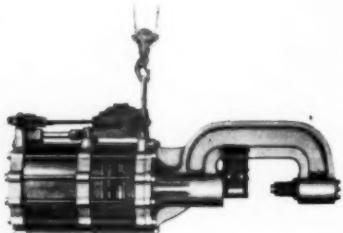
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Vol. IV.

APRIL, 1936

No. 12

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Application blanks and information pertaining to membership in the American Society of Tool Engineers may be had by addressing *The Tool Engineer*, 2842 W. Grand Boulevard, Detroit, Michigan, or the Secretary's office, 31 Melbourne Ave., Detroit, Michigan. **Dues** are \$5 initiation fee, \$6 per year for senior grade membership and \$3 per year for junior grade membership. Junior membership initiation fee \$2.

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Owing to the nature of the American Society of Tool Engineers organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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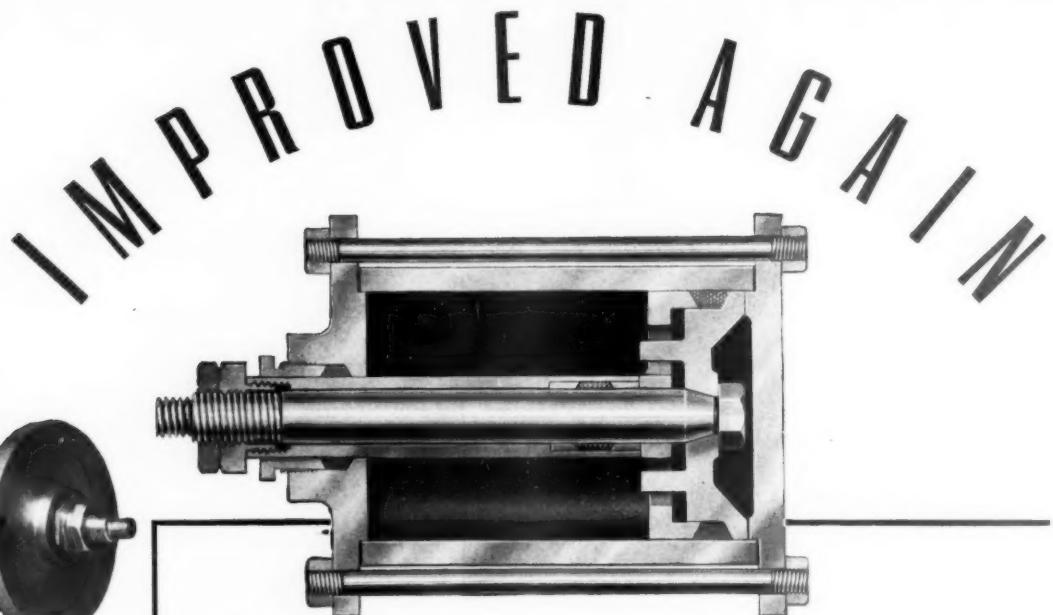
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APRIL CHAPTER MEETINGS

CLEVELAND CHAPTER

APRIL 9th, 1936, AT 8 P. M.

at

CLEVELAND ENGINEERING SOCIETY

HANNA BUILDING

Technical Session

Speaker: MR. MILLARD ROMAINE, Director of Engineering Service, Cincinnati Milling Machine Company

This will be a Stereopticon Lecture on Milling Machines and Milling Fixtures for mass production also showing designs of fixtures and giving data relative to feeds and speeds, cutter diameters, production, etc.

Mr. Millard Romaine is a Mechanical Engineer, graduating from the Co-operative Engineering Course at the University of Cincinnati, Class of 1918. Since January, 1919, he has been in charge of all specifications and the sale of special equipment for Milling and Surface Broaching Machines at Cincinnati Milling Machine Company.

All Production Executives, Superintendents, Foremen, and Guests of Tool Engineers Are Invited.

DETROIT CHAPTER

APRIL 9th, 1936

Dinner: 6:30 P. M.

Meeting: 8:00 P. M.

at

HOTEL FORT SHELBY

Speaker: CHARLES MILTON NEWCOMB

Subject: "WHAT ARE YOU AFRAID OF?"

This meeting, a highlight of this season, will be addressed by a speaker of national reputation and prominence. He comes to us so highly recommended that it is difficult to convey his many outstanding qualifications. He will doubtless bring to members and their guests a message they will find tremendously instructive as well as entertaining. In this address, "What Are You Afraid Of?", Mr. Newcomb blends a deep sincerity with humor, the whole proving intensely interesting and inspirational.

Mr. Newcomb is one of the most sought after public speakers in the country. He has appeared before various Advertising and Rotary Clubs, as well as many of the country's leading associations. He comes to us on this occasion through the courtesy of Motch & Merryweather Machinery Company.

Also at this meeting, an introduction and installation of National and Detroit Chapter Officers for the coming year will be made.

Make your reservations immediately to be sure of dinner places. Dinner tickets are \$1.50 each. There will be special entertainment, come early. Don't miss any of the many events scheduled for this gala occasion.

RACINE

MONDAY, APRIL 6, 1936

DINNER: 6:30 P. M.

at

HOTEL RACINE—MAIN DINING ROOM

Speaker: BERNARD E. FLEMING, Lubrication Engineer, Wadham's Oil Company, affiliated with the Socony-Vacuum Oil Company, Inc.

Subject: "Lubricants and Coolants in Machine Shop."

Mr. Fleming has had a broad experience in this field. For the past fifteen years he has been in direct contact with the metal machining industry. During the last ten years he has been interested as a lubrication engineer in the development and application of metal cutting lubricants and coolants.

Mr. Fleming's paper will cover the practical application of machine tool lubrication and cutting lubricants and compounds for cutting and grinding of all kinds of metals. This meeting promises to be one of the most interesting in the season's series. Slides will be used, showing the action and the results of lubricants used. An exhibit of various types of lubricants and compounds will also be on display.

PRODUCTION PERSPECTIVES

• • •

Considering all industrial centers of the nation, **production as a whole, has been good.** In a number of sections **two and three shifts are running**, although **Detroit area's lull still continues**, but with high expectations for the not too distant future. Some predict **automotive production will pick up and reach a high point that has not been known in years.** The floods in New England and in the Ohio valley have had an effect which will be more pronounced as a checkup of the damage is made and it is seen just how much repair work and new equipment will have to be made or purchased. As early as March 13th a forerunner of the flood conditions to come was seen at the **L. S. Starrett plant at Athol, Massachusetts**, when an ice jam in the Miller River broke the company's dam and interrupted power service. The ice floe also crashed in a building of the company doing damage to the extent of about \$15,000.

Flood waters which swept sections of Connecticut also took a heavy toll of industrial property. Among the hardest-hit was **Colt Patent Firearms Mfg. Co., Hartford**, which suffered heavy damage when a dike gave way and the grit-laden waters of the Connecticut River poured into the basement and first floor. All the company's heavy machinery was in the basement, including heat-treating and gas furnaces. The **Taylor & Fenn** and **Atlantic Screw Works** plants in Hartford also suffered damage to valuable equipment. All other factories in the city were forced to close down when the power

failed. The **Remington Noisless Typewriter** plant in Middletown, Conn., had four feet of water on its ground floor, with prospects of a lengthy shutdown. Elsewhere in Connecticut factories which suffered severe flood damage included the **Seymour Mfg. Co.**, and **New Haven Copper Co.**, both in Seymour. The full list of mass production plants taking punishment from the flood is too long for this space. Just how much the damage from floods in various industrial sections, or what the loss of time from production will be, is unestimated as this page goes to press.

Small tool manufacturing industries of western New England, during March, **showed continued production gains**, while prospects for spring operations appear bright. Such centers as Greenfield, Athol, Worcester and Springfield were showing excellent activity prior to the flood conditions. **Greenfield Tap and Die** was **operating three shifts** in its Wiley & Russell plant, with two shifts in its other divisions. **Starrett** and **Union Twist Drill** also are busy plants of this area. **Millers Falls** is another, at present **employing about 600 persons** full time. **Porter-McLeod** Machine Company in Hatfield, Massachusetts are fairly busy as a result of growing sales for a cutlery polishing machine, the design of which was completed recently. An improved grinding machine is also being designed by the company to serve the same industry. From Springfield, Massachusetts, we hear that **John F. Murphy** has

(Continued on page 23.)

Open Forum Attracts Many

Diversity of Subjects Appeal to Tool Engineers

Editor's Note: Detroit Chapter's March meeting was an open forum, or discussion, for all present to take part in. Several prepared talks were given by members to start the discussions, and these are reprinted here in part. A.S.T.E. members and readers of THE TOOL ENGINEER are invited to send in their suggestions for further meetings of this kind—or for discussion in these pages. Mr. Ed. Johnson, who conducted this meeting, opened the forum as follows:

Mr. Johnson: "In arranging this meeting tonight we planned a program whereby we thought we could entertain ourselves. We have sufficient talent in the A.S.T.E. and, in an effort to bring out some of this we have arranged a meeting in which we will answer questions from the floor.

"Mr. Staples will speak on the following subjects: 'Why are there so few college graduates in Tool Engineering?' and 'How can young men get started in Tool Engineering when employers are demanding experience?'"

Why Are There So Few College Graduates in Tool Engineering?

Mr. Staples: "Now, the first question, 'Why are there so few college graduates in Tool Engineering?' The answer, to me, is obvious. In the first place, colleges do not make a specialty of training Tool Engineers and likewise men do not go to college to learn Tool Engineering. A college graduate is overtrained technically for a Tool Engineer's job but undertrained practically. The college can not give a shop touch to a man and a good engineer requires a little shop touch.

"Now, the next question. 'How can young men get started in Tool Engineering when employers are demanding experience?' A question of that kind is more serious than you would first imagine unless you would give it a little thought because that question effects Youth and, the way we treat our Youth today depends a whole lot on the kind of men we will have in the future.

"With that in mind I wrote up a number of qualifications that I thought a man should have before he should knock at the front door and ask for a job as a Tool Engineer. Following are the qualifications: Sweeping factory floors and trucking; Assembly — non-production; Machine operation; Machine repair; Heat treating; Tool making; Die making; Inspection; Steel and its uses; Geometry; Mechanics; Physics; Mathematics; Designing."

Mr. Staples then went on to explain some of the reasons why a young man should have these qualifications to become a Tool Engineer.

Mr. Johnson: "Now we have another prepared talk on this same subject by Mr. O. B. Jones of the Detroit College of Applied Sciences. Mr. Jones will attempt to show the other side of this same subject; the opposite of what you have just heard."

Mr. Jones: "Following Mr. Staples' advice, that will make a Tool Designer a young man around fifty-five years old, so I think Mr. Staples' answer is simply that it can not be done; a young man can not get into this business. I would say this, I do not see where anyone should want to get into the business if it would take fifteen years to get into it.

I believe a young man should be encouraged to some extent. For that reason, I want to picture the other side of it.

"I am thinking of a young man around twenty to twenty-five years of age and I am thinking if the policy we have followed in the past has not kept young men out of the business.

"I believe that there are many more men with engineering training, I mean college training, in this business than we realize. If our Society should continue in existence for another ten years without having young men in it I can not imagine what it is going to amount to. It has always been my idea that young men are filled with new ideas—they like to experiment.

"There are many Tool Engineers who have profited by the experience of others and the way a man profits by the experience of others is by studying the history of what others have done. One day I was talking to an Employment Manager and he said, 'I believe I hired one of your men the other day.' I asked 'Is that the only one you have up here?' He said, 'Yes, that is the only one I know of.' He had over eighty designers and twenty-three of them were men I had trained. I think that is a revealing thought, that he only thought he had one college man up there but he had twenty-three. You are working side by side with men who have not had anyways near the experience Mr. Staples has mentioned. I think it is important to consider the type of man. In other words, one man might become a tool designer after fifteen year's experience and another man might become a tool designer in two years. We have students in our school and their ages have ranged from seventeen to seventy-two. It has not always proved out that the man with the greatest amount of shop experience was the best designer. In fact, the man with the fifteen years experience is the hardest to teach; so, I have the idea in choosing tool designers that this policy we always follow of asking the man how much shop experience he has had, I do not believe that is as important as whether he has the natural ability, coupled with a good technical training, which would enable him to actually get into the matter of design. A man can learn more from a blueprint of a machine in a half hour than he can by running it for six months. That is, he can learn more about the design and construction and get more ideas than he could by working as a floor sweeper or any other occupation in the shop for fifteen years."

Mr. Rylander: "Since few if any employers bother to look up the past records of applicants, my personal advice to the tyro is to lie like a veteran and take a chance. If he gets fired, find out why and don't make the same mistake twice. Actually, the procedure isn't so hard, considering that at the height of a program, when everybody is hiring, it is a poor salesman who can't peddle himself to somebody.

"Taking a less cynical attitude, however, I know of several employers, especially among jobbing shop owners who are also members of the A.S.T.E.,

who have given many a youngster his first break, with all cards face up on the table. I won't embarrass any of these gentlemen by mentioning names (for which they may possibly concede me a vote of thanks) but there are men here tonight who can look around and find their first employer. If they were initiated into the A.S.T.E. as a result, they should be doubly grateful."

Mr. Diamond: "I wonder if anyone in the audience could give any reasons why a college graduate should get into the Tool Engineering profession?"

Mr. Winter: "To a certain degree both sides are saying the same thing but they have to get together. I think the hitch is probably in our schools. My thought is this; that if they would take the money they spend on buying cheap equipment and buy modern lathes and grinders and show these fellows what real equipment will do and show them what they will do, a lot more ground will be gained. The bad thing about most industrial courses today is, they are 95% management. The students do not know much of anything about machine designs; the application of machinery. Consequently, they have to go out and rub their nose into it before they can find it. Now, the fellows who have had previous shop experience or who have gone to a Trade School and really obtained the feel of things are among those fortunate few and they represent about one to two per cent of the total enrollment in Industrial Engineering. The fellow who does take some sort of college training is a few steps ahead but he has to have practical experience. I believe the schools can do a great deal of work through the use of pictures and slides and what is most important have an instructor who knows his stuff, who can put it across to the boys and should be a man who has had *actual experience*. You can not take a man who has been theoretically trained alone. When you have a combination of the two he can put it across."

Mr. Frank J. Oliver: "Mr. Staples said the college can not give the shop touch to the man. It is a very good argument for the cooperative plan. We have been attempting to take mechanical engineering students and place them in the shops of a large number of companies. Some of the students told me they got more out of the work they did in machine tool repair work than they did in the operation of the machines and their study. We are particularly trying to make these students see the shop side rather than the engineering end. Most of these boys are on shop work and are heading toward the manufacturing side of the picture rather than the product design. However, spending fifteen years at it is spending a little too much. For example: operating one type of machine for a month would be more than sufficient.

"I think trucking is a swell job because it certainly brings him around the shop. We have often tried to select jobs where mechanical skill is not required. The average college man does not want to be a machine operator. He does not want to be a tool or die maker. We will see a lot of college graduates occupying the position of Tool Engineers and Master Mechanics."

Attitude of Management Toward New Tooling and Machine Programs

Mr. Johnson: "Our next question is the 'Attitude

of various managements toward new tooling and machine programs.' I believe Mr. Harper has prepared some material on this subject."

Mr. Harper: "I will speak from the sales side of this subject. From my own point of view it has appeared to me that the managements have sort of looked at a shop tooling program as a necessary evil. Now, I will have to discuss this from the sales angle and speaking of that subject as a salesman, I would say this; that every salesman would prefer that a master mechanic, when he is ready to purchase a group of equipment, at least go through his program with his Tool or process Engineers and formulate a sequence of operations to do a certain unit. I say that for this reason; we believe that in purchasing a machine, or a lot of equipment, it should be broken down into three phases. First, the method, which should be the way of doing the job and production. Second, the price. Third, the delivery.

"We are given a blueprint and asked to quote a price for doing this operation. We know the master mechanic has certain fixed ideas on how he wants the job done. We know the shop has certain problems. We do not get any information as to previous operations or production or locating points. Well, what happens? The salesmen, instead of making one or two or three calls makes a dozen calls and quotations and here is the one thing I want to bring home to every man in the shop; you fellows pay for it either directly or indirectly. That is all added to the cost of the machine.

"Next we have to go through the element of price. We are, in a number of cases, forced to go up against the purchasing departments, who do not know the first thing about mechanical details and who know only one thing—price. The purchasing agent is getting what he pays for; it is something he does not know and, personally, I believe that the purchasing of machine tools should be left in the hands of the mechanical department entirely and done away with from the purchasing side.

"After we get through with that particular phase of it there remains the element of delivery. In a good many cases today every machine that is purchased has a special tooling problem of its own and after an order is given usually a print or a series of prints is made out showing tool layout for the job. That tool layout is based on the actual quotation made. I have known cases where the master mechanic evidently did not read his quotations because when the tool layout was made he said he did not buy anything like that. Be sure, when a quotation is made, you read that quotation carefully enough to see that you know what you are purchasing. You know Doctors have ethics, Attorneys have ethics; are there any ethics in the machine tool professions?"

Mr. Lannen: "Speaking of ethics, I would say the ethics are very high. It is a very rare thing for a man to change his quotation."

Mr. Smila: "We do in asking for quotations, say the method is up to you, Machine Tool Builder. What we are after is a reduction of price in our product. As a rule, on a large line such as a crank-shaft or cylinder line, we will combine operations. One man will say, 'Why don't you do this?' If we did not listen to these suggestions we would not make nearly the progress that we do."

The Place in the Picture Tool Engineers Occupy in the Eyes of Management

Mr. Johnson: "We will go on with the next subject, which is, 'The place in the picture that Tool Engineers occupy in the eyes of management.'"

Mr. Fitch: "First, I am going to interpret Tool Engineering as being a functional service division of an organization. The picture as to management's viewpoint depends upon the nature of the enterprise. If a large number of parts are desired then Tool Engineering becomes an important factor. There are two types in an organization of this kind—Tool Engineers and Tool Designing Engineers; efforts the same, and principles underlying their objective the same; accuracy, maintenance and ease and speed of operation. Management's check on the results of Tool Engineering is first, the original cost of tools, maintenance cost of those tools, the accuracy of those tools in their ability to duplicate parts and safety in operation. If these items are good, or better than others, then a good job has been done. A particular Tool Engineer and perhaps the entire group would not be listed on the management's book of those who accomplish unless certain conditions existed."

Mr. Johnson: "What do you mean by certain conditions?"

Mr. Fitch: "I mean function set-ups and working methods. I think we should consider that there must be a difference between the functions of a Tool Engineer in a small manufacturing plant as between those who operate a large manufacturing plant. Their activities may include several plants under separate management and responsibilities but whose methods generally are determined and controlled by central management. My experience has been such that my answers will have to apply to that."

"There are always two open roads of travel. On one road the sign reads, 'High standards of quality and coordinated low costs.' On the other road the sign reads, 'Doubtful quality, to points elsewhere and unknown costs.'"

Mr. Johnson: "What picture could a good Tool Engineer make if management would keep both roads open and all signs up? How would one know which one to take?"

Mr. Fitch: "Well, he would want a little background of experience. You can be sure if the management closes the road except the one to high standards they also conceive methods and plans that need a high type to carry them out. Tool Engineering is a function as valuable as management's methods are good. Methods are good if they are conceived with the idea that they will expose functional failures of a plan during a program. We see, therefore, that Tool Engineering as a function is no different than any other function or no more important than is the function of determining the correct direct labor that should be required to produce a part as specified; or any more important than the function of specifications and usage of all the numerous expense materials that must be required to produce the part; or any more important, perhaps, than the economics of the plant layouts as applied to the picture as a whole."

Mr. Johnson: "What type of resistance might a Process Engineer encounter with plant supervision?"

Mr. Fitch: "First, if the standard of quality could be fabricated as designed in the part to be produced, we will also say plant supervision required two or three more plans. He would compare the cost of equipment; including special tools, dies, jigs and fixtures, lighting, re-arrangement, motorizing, etc., and to this cost he would add the direct labor cost in money and to this overall cost to producing the part as required he would balance with the high equipment cost and low labor cost on the one plan and the low equipment cost and high labor cost on the other. It is true that a good Tool Engineer could and would analyze his process on this basis, if the management's methods provided the means of acquiring this information. If management's plans and methods requiring talent in the accomplishment of all functions, and all cost knowledge is available to all, then Tool Engineers will have a pronounced sales resistance of their wares if the buyer is better informed on all costs relative to factors; for to be born a good Tool Engineer is an accident but to die one is an achievement."

What Becomes of Tools After Production Is Finished?

Mr. Johnson: "Our next subject is: 'What becomes of tools after production is finished?'"

Mr. Kiefer: "First; What becomes of the part? In most cases it is to be serviced sometime later on and it would be impossible for the service division to take over all the tools that are used in the manufacture of automobiles. The first thought of the Tool Engineer in a Service department is: how can he make this part off of some fixture or tool he has used in a previous model? Many a time a production plant will have advance knowledge of what is coming through and the master mechanic of that plant has the right to say whether he is going to give you the tools that he has just previously used or whether you are going to have to dig them up somewhere else. The Tool Engineer has a mental picture of what fixtures have been stored away and the thought in his mind at all times is to develop a line in the Service plant that is flexible enough to take in what has passed and what is to come. If the tools can be brought in they are stored, if it would be a part that would be very hard to make nothing is done to that particular jig or fixture until such a time as orders are received for parts to be run on it. On such parts you usually find that the Planning Department will ask the Production Department to run their all-time requirements before the fixtures are torn off the machine."

"Tools, after they have been kept for about five years are turned over to salvage after an investigation has been sent through the plant to see how many more will be needed for all-time requirements. They find it to be very few parts after five years. The salvage will take out the hardened steel parts and segregate them from the case steel or bronze or whatever it may be. That is turned over to the by-products department, who in turn will sell it as scrap."

"There is a little different angle on perishable tools, such as, drills, reamers, hobs and milling machine cutters. Most plants have a surplus tool supply in their organization where all these surplus tools are gathered, and when a requisition is made out for a certain drill or reamer or counterbore,

(Continued on page 22).

PATENTS

PROTECTING INVENTIONS

Economic Considerations. The economic value of an invention is the governing factor in determining whether or not patent protection should be obtained thereon.

Private inventors seek to commercialize their inventions or sell them outright or on a royalty basis to others. Manufacturing and mercantile companies seek to develop and improve their respective lines, protect their existing business, surpass competitors, obtain new products and create an advertising advantage by means of new inventions.

Whenever a general idea of a new development or improvement has been formulated to such an extent that it is workable and capable of performing the function or functions contemplated of it, and those skilled in the art could reduce the same to practice without the exercise of additional inventive faculties, then, an invention has in fact been conceived.

From the first broad conception to the ultimate improved and detailed development the question of patent protection should be considered and safeguarded. Patent counsel should be retained to protect the interests of the inventor and to guide the developments and business of the manufacturing or mercantile company both from the standpoint of patent protection and possible infringement.

Importance of Dates. It is often required to prove the date of conception of an invention, when the first written description and drawing of it was made, when it was first disclosed to others, and when it was first reduced to practice in order to determine which of two or more inventors was, in fact, the first inventor thereof.

Therefore, a complete record of dates appertaining to each invention and every improvement thereto should be accurately kept and filed away for future reference. This should be done even though the invention appears commercially valueless at the time, since it may prove to be of value in view of subsequent developments.

Evidence of Conception. An evidence of conception should contain the following:

- (a) The date.
- (b) The name, address and citizenship of the inventor or inventors.
- (c) A short title of the invention.
- (d) A drawing fully disclosing the invention.
- (e) A sufficiently detailed description to make the disclosure in the drawing understandable.
- (f) The signature of the inventor or inventors.
- (g) And be subscribed to by two witnesses substantially as follows:

The herein disclosed and described invention was fully explained to me and understood by me this, the day of 19.....

Witness.

Disclosure to Others. An inventor is incompetent in the eyes of the law to testify to the date of conception of his own invention. A disclosure to others must be relied upon to establish the date of inven-

Third in a series presenting a concise, informative guide on the subject of patents.

By EVERETT G. WRIGHT

Patent Attorney
Detroit, Michigan

Member of the Michigan and Federal
Patent Bars

tion and such disclosure must be sufficiently complete to enable the person or persons to whom the invention was disclosed to identify the invention and to testify that upon a certain date it had been disclosed to and understood by them.

Reduction to Practice. There must be a reduction to practice after the conception of an invention to complete the inventive act. Reduction to practice may be either "actual" or constructive."

Actual reduction to practice is accomplished by embodying the invention in a practical, tangible form capable of producing the desired result.

Constructive reduction to practice is accomplished by filing a complete patent application adequately disclosing the invention.

Inventors should exercise diligence in reducing their inventions to practice to avoid the possibility of forfeiting their rights to inventions to others who may have been later to conceive but earlier to reduce to practice.

Rules of Priority of Inventions. As between two or more inventors the following rules of priority are used to determine which in fact was the first inventor:

- (a) The first to conceive and the first to reduce to practice, is presumed to be the first inventor.
- (b) The first to conceive and the last to reduce to practice, is the first inventor if he used reasonable diligence in reducing to practice.
- (c) The last to conceive and the first to reduce to practice, is the first inventor if the first to conceive and the last to reduce to practice failed to exercise reasonable diligence between conception and reduction to practice.

Timely Application for Patent. The filing of an application for patent as soon as practicable after the conception of an invention has the distinct advantage of providing the inventor with an early date of reduction to practice. It also avoids the possibility of the inventor being charged with abandonment or the lack of diligence in reducing his invention to practice.

A delay in filing an application for patent may cause the inventor to be barred by statute from obtaining a patent if his invention was patented or described in any printed publication in this or any foreign country, or if it was in public use or on sale in this country, more than two years prior to his application. A single sale or a single public use may be sufficient to establish a statutory bar to a patent, provided, however, that the use was not purely for experimental purposes.

Marking Patented Articles. The statute provides statutory provision covering the marking of unpatented articles. Many articles for which patent protection is being sought are marked "patent applied for" or "patents pending." While such marking may have certain commercial advantages, it in no manner affects the patent situation in connection with an

(Continued on page 16).

● **Capacity**—The model B-225H Vertical Hydraulic Feed NATCO Driller shown at the right is built for a variety of applications. It has a rated capacity of one 1 1/4" drill in steel—or an equal capacity in a larger number of smaller drills.

● **Hydraulic Feed—Simplified Control**—This machine is arranged with a semi-automatic hydraulic feed. The simplified control permits instant and positive control of the head under all conditions.

● **Adjustable Feeding Rate and Feed Lengths**—The feeding rate is easily adjusted as required by means of a valve. The length of the rapid traverse and feed strokes are adjusted by valve trip dogs which are located on the right hand side of the head.

● **Variety of Heads and Spindle Speeds**—This machine may be arranged with a flat slide for the mounting of a single spindle hi-duty head, a slow speed head for boring operations, or a fixed center multiple spindle drill head for high production work. This machine may also be arranged with three different sized adjustable multiple spindle heads equipped with either 8 or 16 spindles. A variety of spindle speeds are provided for all heads.

● **Solid Built-in Table or Adjustable Table**—Either a solid built-in table or an adjustable table can be provided. Both types are arranged with a wide coolant channel and coolant return.

Because of its great flexibility and its simple sturdy design—this machine has proved itself to be a valuable piece of shop equipment.



Consider the features of this **NATCO** Multiple Driller...

Install One Today and Cut Drilling Costs

● The machine shown may not fit in your shop—yet among the many types and sizes there is one that will fit your particular jobs. Let NATCO engineers aid you in coming to a practical and profitable solution of your "hole problem." They are ready and willing to make a complete survey of your drilling, boring and tapping operations without any sort of

an obligation on your part. Call a NATCO representative—do it today.

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NATCO

Drilling, Boring,
and Tapping Equipment

TOOL COMPANY OFFICIAL URGES INTEREST IN POLITICS

Stockholders of the Millers Falls Company recently received from the president of the company, Philip Rogers, a letter in which they are urged to take greater interest in local, state and national politics in an effort to curtail expenditures which, the letter states, may prove disastrous if not halted. President Roger's letter to Millers Falls Stockholders, in part, follows:

"You have entrusted to the management the responsibility of protecting your investment in this company. It is the opinion of the management that the seriousness of the financial condition of this country and the trend toward passing legislation for special interests and not for the common good, together with a very decided lack of consideration for the taxpayer should be given serious thought by everyone who has the best interest of this country at heart.

"It is our belief that the extravagance practiced, both in national and state politics and in many instances in local politics has been developed to such an extent that if it is not curbed this country will face disaster. It is our opinion that every stockholder and owner of property in the country should make it his or her business to take a very real and definite interest in politics and in the type of candidate who is running for office. We believe this to be the duty of every citizen. We further believe that if this is not done, if we sit idly by and permit legislation to be enacted encouraging extravagance and class legislation, there will come a day when there will be little left for us except to wish that we had taken an interest while there was yet time.

"This letter is not written in any partisan spirit, nor does it recommend or condemn any candidates or any particular party for any particular office. It is simply an appeal . . . to try and stem the present trend in governmental activity and turn it in the proper direction away from radicalism and insupportable debt so contrary to our American ideals."

P A T E N T S

(Continued from page 14).

invention except that an article so marked and sold may be conclusive proof of reduction to practice.

Marking Patented Articles. The statute provides that: "It shall be the duty of all patentees and their assigns and legal representatives, and of all persons making or vending any patented article under them, to give sufficient notice to the public that the same is patented; either by fixing thereon the word 'patent' together with the number of the patent, or when, from the character of the article, this cannot be done, by fixing to it, or to the package wherein one or more of them is enclosed, a label containing a like notice."

Notice of Infringement. In order to enforce patent rights against infringers, it is either necessary to give and prove actual notice of infringement to infringers, or to give sufficient notice of infringement to the public by marking patented articles as such in accordance with the statute.

(To be continued.)

NEW EQUIPMENT

Hanna Electric Hydraulic Riveter—A self-contained riveter embodying flexibility of speed and load ratio, cushioned application of forces and ability to take peak loads smoothly and without damage to the mechanism. It may be equipped with Oilgear Fluid Power Pump direct driven by an electric motor through a flexible coupling. At maximum pressure of 3,000 lbs. per square inch this riveter exerts 80 tons on the dies. Also available in capacities of 20, 40, and 60 tons. Reach and gap may be varied to suit the work.

Ingersoll Cemented Carbide Cutters—All Ingersoll "Zee Lock" Cutters can be designed for the use of cemented carbide; Face Mills and End Mills, Side Mills, Core Drills, Reamers, Hollow Mills, Facing Heads, etc., are all adaptable to this productive cutting material. "Zee Lock" Cutter Blades tipped with cemented carbide, are inserted into a forged and case hardened alloy steel cutter body. The Zee-shaped wedge securely retains the serrated cutter blade in the cutter housing while the wedge hooks the back of the blade and the front of the cutter body. This, the Company states, makes it impossible for the blade to shift backwards or inwards from the cut.

The Ex-Cell-O Style No. 48 Carbide Tool Grinder—Just announced by the Ex-Cell-O Aircraft & Tool Company, this new machine is designed for grinding all sizes of single point turning, facing and boring tools, right or left hand, high speed steel and cemented carbide tools of the larger size range. Both peripheral grinding on straight-type vitrified wheels and face grinding on cup-type vitrified wheels can be done on this machine. The grinder is of the double-end type equipped with commercial ball bearings and driven by a double "V" belt from an electric motor located in the base. Adjustable tool tables with hardened and ground surface are provided for each end of the machine, one for using a straight wheel and the other for a cup wheel. If it is desirable to replace the cup wheel with a straight wheel, another table furnished as extra equipment is used. A slot is provided across the face of each table to guide the wheel dresser and angularly adjustable tool protractor. A graduated scale is provided on each table for adjusting the table up to 16 degrees above or below center. The base of the machine is a heavy one-piece casting.

Rockford Machine Tool Company—New "Hy-Draulic" Planer—The Rockford Machine Tool Company, Rockford, Illinois, is now marketing a new "Rockford Hy-Draulic Planer." The company who has pioneered the application of hydraulic pressure in both Shaper-Planers and Hy-Draulic Shapers, announces the new machine after several years of research and experimental development. Features claimed for the new machine are; simplified construction, direct economical application of power, longer life of cutting edges, smooth, powerful, steady cutting strokes instantly adjustable to any desired rate within the capacity of the hydraulic equipment, elimination of "gear marks" and prevention of chatter. Following are some general specifications for the new machine: Maximum pull to table . . . 24,000 lbs; Maximum distance from table to underside of cross-rail . . . 37½"; Length

(Continued on page 24).

TRYING TO LOCATE THAT "SQUEAKY" SPRING



You can't hear a die spring "squeak," you say?

Possibly not, but inferior springs—or springs not adapted to their job—fairly SHRIEK from fatigue. Shortly they BREAK. The resulting lost time is costly—and unnecessary.

HOW TO SECURE LONGER DIE SPRING LIFE

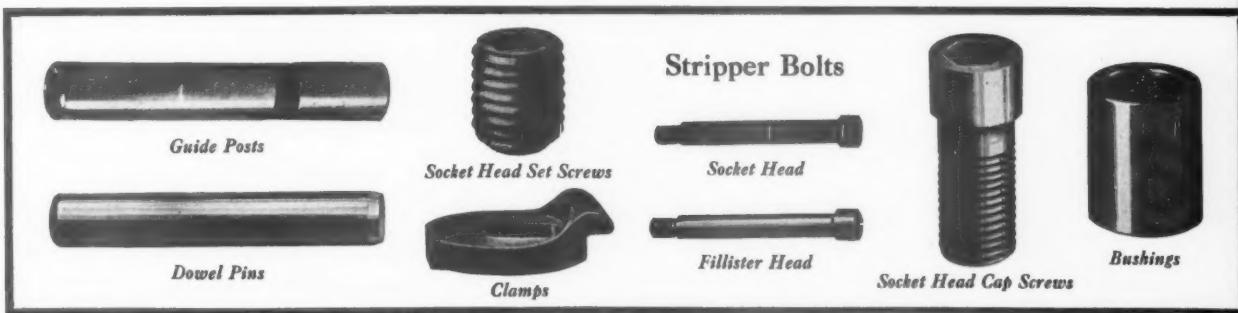


Flat Rounded Spring

Select your die springs from the chart in your Danly Catalog. You'll find exactly the "Standard" or the "Special" springs that your work demands. Danly Die Springs *last longer*. They are made of Silico-Manganese Steel, carefully heat treated and hardened after coiling. They are made Flat-Rounded or Square for Pressure-Pad, Knock-Out and Stripper Plate service.

And when you order Danly Die Springs, remember that Danly Guide Posts . . . Bushings . . . Clamps . . . Dowel Pins . . . Socket Head Cap and Set Screws . . . Stripper Bolts and Precision and Commercial Die Sets are quality Die Makers' Supplies, too. They are stocked in all branches for immediate delivery.

See your Danly Catalog for prices and discounts or send your requirements to the nearest Danly branch office plant.



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DANLY

DIE MAKERS' SUPPLIES

EDITORIAL

Not so long ago, in a city some distance from Detroit, a production engineer asked: "What is this Society of Tool Engineers?"

"It is," we told him, "an organization of men like yourself, and includes the whole range from the tool designer up to the big executive in charge of production—all having common interests, since all are concerned with the use of tools for mass production. A few of these men realizing the need of an organization where they could exchange ideas, hold meetings and discussions on matters relating to tools and tooling, got together, several years ago, and started The American Society of Tool Engineers."

Nodding, our interrogator said, "We hear a lot about it down here and we are curious—we wondered just what you were doing and how much you are accomplishing along the lines you speak of."

"Well—I wish you could sit in on one of our meetings, but I'll tell you that the discussions and the talks on subjects right down our alley, the dissemination of information, exchanging of ideas, the work on A.S.T.E. standards, and our Speakers' Club are some of the ways we accomplish our aims in The Society, not to mention the good fellowship fostered, our social activities, the technical library, and the confidential employment service maintained by The Society. You know, there are many ways that A.S.T.E. members gain many times the value of the nominal cost of membership. Every member gets out of A.S.T.E. in direct proportion what he puts into it."

"Well, from what you say, I gather that this A.S.T.E. is an organization with a very serious purpose."

"It is serious enough, all right, or it wouldn't have grown to its present proportions in the few short years of its existence. But, there is fun too, for work is leavened with pleasure. A.S.T.E. doesn't want Mr. Tool Engineer to become a dull boy, so we have our Speakers' Club, where some of the boys learn to put their ideas across in an interesting way. Then we have social activities, dinner meetings with entertainment, dances, outings, stag mixers, golf tournaments, and other events where we all get acquainted."

"You wouldn't be selling me a membership in the A.S.T.E., would you?"

"Well,—I'd be glad to take your application, but remember, you asked me and I'm telling you. After being a production man for twenty years I'm frank to tell you that I am enthusiastic about the A.S.T.E. It is the only organization that is built right up to my own specifications. I am certain that A.S.T.E. is going places and with its progressive program I

am getting more out of it than I ever thought would be possible. You know, we Tool Engineers, have actually been the most backward of any of the key group. We have been either too timid to assert ourselves, or, what is more likely, we have been so split up under various titles that we have had no professional entity. Well, A.S.T.E. is changing that. The Tool Engineer is gaining more and more recognition and through A.S.T.E. is finding his place in the industrial world."

"You know, I have thought for a long time that production men have needed some kind of a clearing house where the men from various plants could get together for mutual benefit and pleasure and from what you say, the A.S.T.E. seems to fill that need. You, know, I'm plenty rushed—long hours during programs and still I know a lot of the men over at the Tractor Plant at Standard Electric—in nearly all the plants down here,—but the only time I ever get to see them is when I accidentally bump into them. I guess they're just as busy as I am, for that matter."

"You sound just like Andy Scovel up in Flint—he's Tool Engineer (Master Mechanic) with National Products—a demon for work—hasn't had a Sunday with his family in weeks, nights, too, he's always at the plant. I remember someone mentioning A.S.T.E. to him a couple of years ago. Well, he said, I wouldn't have time for anything like that, but after a couple of months the idea must have grown on him for his application came through, and it wasn't so very long ago that I saw him at an A.S.T.E. meeting and he told me that he was sure glad he had made the effort to become a member. I asked him why and he told me that someone had made the crack that the exchange of one good idea was worth many times the price of A.S.T.E. membership and about that time when he never got out of the plant except to go home and sleep and have some of his meals there—any ideas, with a little sociability thrown in, was what he needed and wanted—and, how he had enjoyed those get-togethers and meeting the men from other plants. In fact, he told me, he had even played in an A.S.T.E. golf tournament and incidentally, as for ideas, he had picked up several very good ideas that had saved his company some real money."

Aside from the benefits anyone would derive from membership in A.S.T.E. there is another way of looking at this question—and that is through the eyes of one of America's greatest men, when he said:

"Every man should devote some part of his time to the building up of the industry or profession of which he is a part."

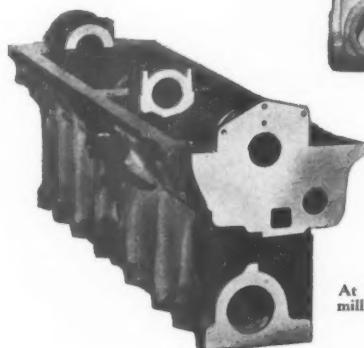
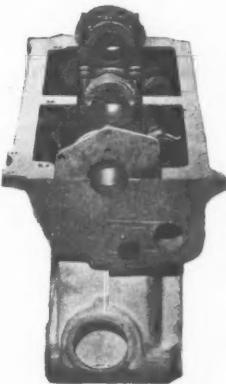
—Theodore Roosevelt.

Now, what do *you* think—did our friend join A.S.T.E.—or didn't he? Well, we're pleased to tell you that he did, in fact, he is now very active in the affairs of the chapter in the city where we first met.



Automatic Process Milling

At right—Cylinder block as it enters Process Miller.



At left—Block after milling as described at right.

The 32½ ton Sundstrand Rigidmil shown above, termed a "Process Miller," performs several milling operations on cylinder blocks indexed from station to station. It is electrically controlled, hydraulically operated and automatically lubricated by Sundstrand-designed and built equipment. Protective devices and signal lights insure continuity of operation with complete safety to operator, work, and machine. Cylinder blocks from previous operations come to the left end of the Process Miller, heads down, from the shop conveyor. They are then moved to the right by latches in a reciprocating slide or "shuttle" equal in length to the machine-bed. At the first station two blocks are moved transversely to milling position, raised simultaneously, and clamped securely. A 4-spindle traveling head now mills two surfaces on each block. Both blocks then return to the shuttle, move forward to the next station where they are shifted sidewise, raised, and clamped. Then the center and end crankshaft bearings of both blocks are straddle-milled by eight cutters on a vertical slide. Blocks return again to the shuttle, move forward to the third station which duplicates the first operation and finish-mills the end surfaces. Again the blocks descend and are moved forward to be placed on the shop conveyor. Shuttle moves ten blocks at a time, also sweeps chips forward. Machine mills six blocks simultaneously. One man operates the machine from a control station near the first milling operation.

Investigate! Write, today, for complete details of Process Milling and its possibilities for increasing efficiency and economy on a wide variety of operations.

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A. S. T. E. Chapter News

CLEVELAND

On March 12th The Cleveland Chapter held its regular dinner meeting at the Allerton Hotel.

Mr. A. H. d'Arcambal, who has already spoken before the Detroit and Racine Chapters and therefore does not need any introduction, gave a most interesting and practical lecture on Improvements Made in Metal Cutting Tools. He said there were four important factors that govern good cutting tools: design, quality of steel, hardening, and finish. He went into detail on each factor, pointing out the ever increasing demand for cutting tools to produce parts made of harder and tougher materials, and a general tendency to hold production to closer tolerances.

DETROIT

Detroit Chapter held its regular meeting at the Hotel Fort Shelby on March 14th. This was a most unusual and important meeting as it was an open forum meeting on a wide diversity of subjects—some of which are reprinted elsewhere in this issue. An election of Detroit Chapter Officers also took place. Results of the balloting of members present resulted in the following elections: Chapter Chairman, Mr. O. W. Winter; Chapter Secretary, Mr. A. E. Rylander; Chapter Treasurer, Mr. W. H. Smila. Short acceptances of their offices were given by each of the newly elected officers. The meeting was then thrown open for the discussion of the subjects, which had been announced in advance, for all members and

guests to participate in. Among those who took part in these discussions were Messrs. Staples, Jones, Oliver, Smila, Forsman, Winter, Sargent, Carpenter, Rylander, Fitch, Johnson, Kieffer, Harper, Schreiber, Holt, Lannen and Diamond. Mr. Ed. Johnson, Standards Engineer of the Packard Motor Company was in charge of the forum. How interesting and entertaining as well as humorous an open discussion of this kind can be, may be gleaned from a perusal of some of these subjects which are published in this issue of *The Tool Engineer*.

At this same meeting an announcement of a Speakers' Club was made by Mr. Smila. Mr. Heffner, the coach of the Speakers' Club also gave a brief description of the course and told of some of the interesting objects and sidelights of previous sessions of this group in former years. The meeting adjourned at about 11:15 p. m.

RACINE

Tool Engineers of Racine and other cities in this vicinity were addressed Monday evening, March 2nd, at Hotel Racine, by Mr. Boyd H. Work, Assistant Chief of the Engineering Division, The Carborundum Company, Niagara Falls, New York.

Speaking on the subject of "The Manufacture and Application of Electric Furnace Abrasives from the Standpoint of the Abrasive Industry and the Wheel User," he pointed out the importance of selecting the proper grinding wheel for the various



W. H. SMILA, Detroit Chapter
Treasurer, elect.



O. W. WINTER, Detroit Chapter
Chairman, elect.



A. E. RYLANDER, Detroit Chapter
Secretary, elect.

**BARBER-
COLMAN**

HOBs

UNEXCELED
IN
ACCURACY
ON ALMOST
EVERYTHING

**HOB
CUTTERS**

B.C.C.A.

HIGH SPEED

WRITE TODAY
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PRODUCTS

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CHINES, REAMERS,
REAMER SHARP-
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SPECIAL TOOLS

BARBER-COLMAN COMPANY

General Offices and Plant, ROCKFORD, ILLINOIS, U. S. A.

A.S.T.E. CHAPTER NEWS

(Continued from page 20).

applications. The matter of the manufacture of the wheel was covered from the raw material to the finished product. He also had on display a number of abrasive products for inspection by the engineers present.

In addition to the address by Mr. Work, a five-reel motion picture was shown entitled "The Jewels of Industry." The film story opened by taking its audience to Niagara Falls, there viewing the scenic wonders of the Cataracts, the Rapids, and other places of beauty and interest in and about Niagara. Views of the great hydro-electric plants were shown, and the story of the creation of electric energy from the waters of Niagara was told in a most interesting way. The film also took its audience into the large plant of the Carborundum Company, showing in detail how grinding wheels are made from the raw material to the finished product.

An informal discussion was held immediately after the close of the meeting, at which time Mr. Work answered a number of questions regarding application of grinding wheels, etc.

The meeting which was preceded by a dinner was one of a series of monthly gatherings sponsored by the Racine Chapter of the American Society of Tool Engineers. It was largely attended, there being about one hundred present.

Subjects Appeal to Tool Engineers

(Continued from page 19).

that first is passed through this surplus tool department. If the order can be filled there, the purchase requisition will not go any farther. If they have too many, they are turned over to By-products and are disposed of through sale. When a drill or reamer or hob or any such material as high speed steel has served its usefulness it is sent into salvage, where the shanks are usually cut off and segregated and sold as scrap. That is just about the end of any of your tools, when they go to the scrap pile."

Why Is There So Little Recognition Given to Manufacturing Executives?

Mr. Johnson: "Mr. Ed. Hunt was supposed to tell us, 'Why is there so little recognition given to manufacturing executives and Tool Engineers?' Is there anybody here that is prepared to answer that question or comment on it?"

Mr. Lannen: "I am not quite so sure that there is less recognition given to the Tool Engineers. There possibly is, possibly for this reason: The management, let us say it is the man that has the final say of what we are going to build next year—the President. No matter how good he is he has certain mental limitations. You will find he is much more interested in the engineering of the body than he is of the car."

Mr. Carpenter: "Possibly, the reason is, they do not hear of them. They do not cause them enough trouble. We hear of production being stopped or a showing date set back because the car engineers

had to change the design of it. It is very seldom you hear of the program being held up by a Tool Engineer. Maybe, if we were not so amiable we might get a little more recognition."

Mr. McClellan: "The recognition of Tool Engineers in the smaller organization is much more pronounced than it is in our Detroit area. In a small organization the Tool Engineer is called in and asked whether or not it is a feasible machining operation. That is not so in our organizations."

Mr. Sargent: "It might be possible that one thing that enters into this picture is pertaining to an old saying I heard the first time a good many years ago and that was: 'When a Doctor makes a mistake they bury the patient and it is forgotten. When an Engineer makes a mistake it is a monument for everyone to see.' Perhaps all their good deeds are forgotten."

Mr. Johnson: "Now, we have carried this student through. We have him educated and our tools designed and our management into the picture and we come up to the point that we are all assembled here tonight as friends of the A.S.T.E. and the question is: 'What are some of the things that we wish to accomplish; what is the purpose of this Society?' Mr. Lamb, our first Vice-President, will attempt to carry that message back to us."

The Purpose of A.S.T.E.

Mr. Lamb: "This Society is one of the roads towards building the Tool Engineer beyond actual working over his desk. The results we have attained so far are somewhat illustrated tonight, where nearly every speaker was a Tool Engineer and mostly members of this Society. There is one thing that occurred tonight that distressed me a little. That is, when we were nominating candidates for office, when one member after another got up and declined. In my mind, that is entirely the wrong attitude to take because sooner or later the benefits you will derive will repay you many times over for the effort you put into it and the contacts you make."

"Tonight there is a meeting in Cleveland. We also have word from Milwaukee that a group of Tool Engineers there are very anxious to find out all the details in connection with starting a chapter in Milwaukee and the likelihood is that we will have a chapter operating there."

"We have heard a lot of the inadequacies of the college for teaching, which points out the opportunities of this organization, which is to sponsor proper education courses in our colleges so that Tool Engineering may be taught. I wish, at this time to extend a hearty invitation to join with us in building up this Society to even greater positions than it now holds."

Mr. Johnson: "It takes quite a little bit of work to put on a program such as this, but I am sure if more of you would try it you would be more than amply repaid. It has been a pleasure to work with you in putting on this program."

"SIMONDS SHOP NOTES"

A monthly bulletin bearing the above title is announced by Simonds Saw & Steel Co., of Fitchburg, Mass. When writing for free copies mention *The Tool Engineer*.

PRODUCTION PERSPECTIVES

(Continued from page 10).

been appointed Superintendent of the Boston & Albany locomotive shops. From Bristol, Conn., the Bristol Screw Corp. is moving to a new location in nearby Plainville, and the reason is need for more manufacturing space to meet increased demand, according to William L. Gerke, secretary-treasurer. Bryant Electric Co., Bridgeport, Conn., is building a one-story addition at its Railroad avenue plant, to be 90 x 200 feet.

In Milwaukee the Harnischfeger Corporation will begin production of pre-fabricated **steel houses**, late this month. The new houses as produced by this company will have exteriors of waterproof and fire-resistant wall board applied to the steel structure. Structural parts are of steel and it is intended to keep the price of these units to a moderate cost. Engineering will be done at the plant and erection and completing of the house will take place in three weeks after delivery of materials to the building site.

Tool Engineers of the Milwaukee area, having become interested in the American Society of Tool Engineers, already have begun to organize a branch chapter of The Society. At a meeting held in March some two hundred production executives

representing fifteen major industrial plants of the city met to discuss plans for the local organization. April 2 has been set as the date for a first meeting of this group, when it is planned to have National officials of The Society present to assist with the formal establishment of chapter. Similar activity is also under way at St. Louis, Pittsburgh, Hartford, Buffalo, Rockford, Illinois, Chicago and other cities. Interested production executives should get in touch with *The Tool Engineer* for further information.

The Chevrolet commercial body division of General Motors has begun construction of a second plant unit at 1100 West Henry street, Indianapolis, which will provide an additional 230,400 square feet of floor space. The first unit, begun several months ago and now nearing completion, has 240,000 square feet of floor space. The new building will be 320 x 720 feet and of brick, concrete, steel and glass construction. It will be a one-story structure, of the monitor type, originated and perfected by the Chevrolet organization. The plant will probably be completed by fall.

Funeral services for Nelson A. Gladding, 72, vice-president of E. C. Atkins & Company, Indianapolis, saw manufacturers, were held recently. Mr. Gladding died while on a business trip in Portland, Oregon. He was widely known and had been with the Atkins company since 1901.

Indestructible Wheel Company, Inc., Lebanon, Ind., has filed articles of incorporation to manufac-

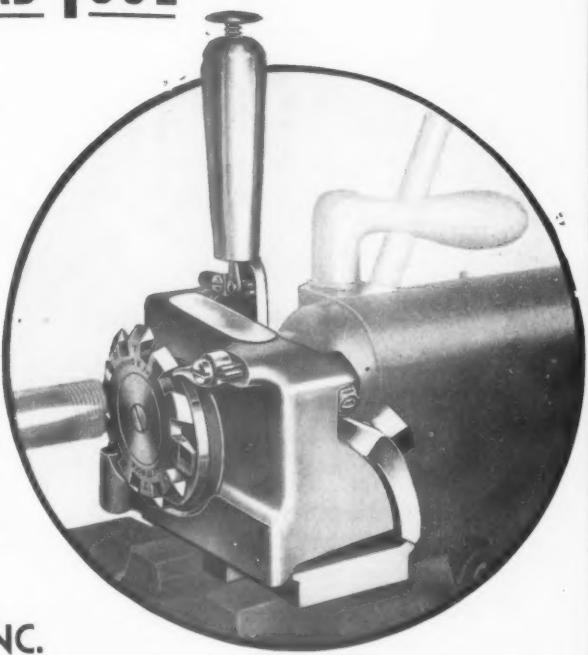
(Continued on page 28).

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Bulletin 110-A



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NEW EQUIPMENT

(Continued from page 16).

of bed (optional) . . . 23 feet to 45 feet; Length of table (optional) . . . 12 feet to 22 feet; Width of table . . . 36" or 42"; Width of face of cross rail . . . 14 1/16"; Horizontal adjustment of side head slide . . . 11"; Down adjustment of rail head slide . . . 11 1/2"; Cutting speeds of table per minute (optional) . . . 0 to 50 feet or more; Return speeds per minute (optional) . . . 10 feet to 150 feet or more; Horizontal feed of rail-head . . . 1/42" to 1/2"; Vertical feeds of rail-head 1/96" to 1/4"; Vertical feeds to side-head . . . 1/48" to 1/2"; Horizontal feeds to side-head . . . Extra; Power rapid traverse is provided for both rail-heads in both directions. Side-head has vertical power rapid traverse. Rockford Hy-Draulic Planers are also available with double housings and in larger sizes.

Universal Collet Chuck—Universal Engineering Company announces two new chucks to their line, the type WW, taking shanks from 1/8" to 3/8" and the type ZZ, taking shanks from 1/2" to 1". The general design of these additions provides for an extremely strong gripping power together with reasonably close concentricity. These chucks are especially adapted to holding end mills, keyway cutters, drills or other tools of this character.

Socket Wrench Holder—The Cleveland Universal Jig Company, Cleveland, Ohio, has recently developed a Socket Wrench Holder which consists of a molded rubber composition base with a separate receptacle for each wrench. These bases are made in two sizes. The larger size accommodates eleven wrenches from 3/32" to 5/8" across the flats and is designed for general machine shop use, especially on repair and assembly operations. The smaller set, designed for tool-maker's use, accommodates eight wrenches ranging in size from 3/32" to 3/8" across the flats. The design of the base is such that the wrenches locate at a slight angle so they will always remain in place, but at the same time the size desired is picked out instantly.

Silent Chain Drive Selector: A very novel and useful sliding chart, which will be of special help to duplicate machinery designing chain drives for equipment, and also for the customer who uses an occasional drive in his plant. The use of this chart makes it a simple matter for anyone to immediately and properly select a chain drive within the range 1/2 to 150 horsepower—or about 95% of actual installations. Address *The Tool Engineer* for copies.

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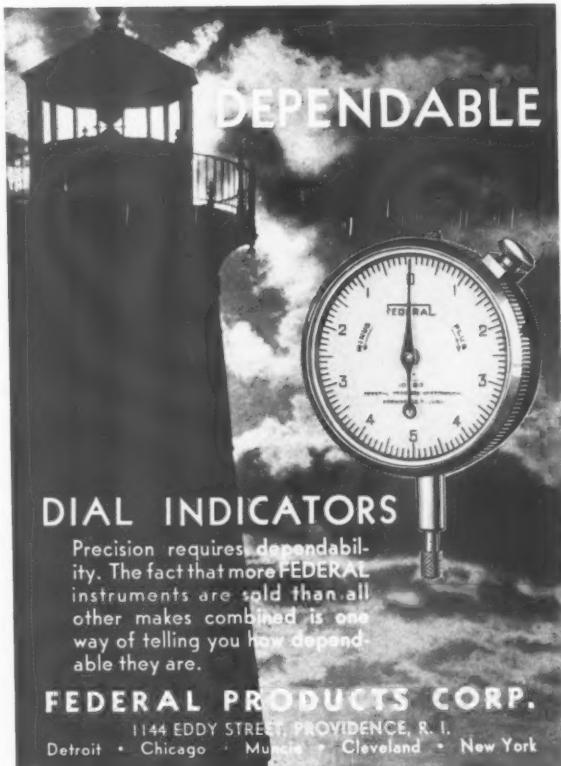
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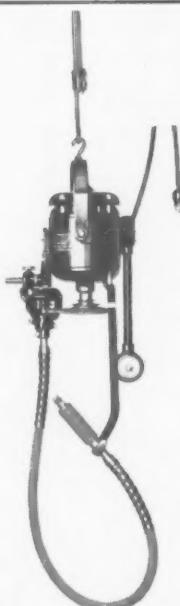
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THIS MONTH'S COVER

Unique Tooling Speeds Production of Pistons

The picture on this month's cover tells its own story to the Tool Engineer. Although the set-up is not particularly unusual, the photograph of it represents an accomplishment in the art of photography.

The picture was made in the Dodge Motor plant in Detroit and shows the specially developed equipment for drilling, simultaneously, twelve oil holes through the two lower ring grooves.

PRODUCTION PERSPECTIVES

(Continued from page 23).

ture wheels, machinery, metal products, automobile parts, etc. Will C. Davis is an incorporator. Paul G. Hoffman, president of the Studebaker Corporation, recently announced that sales for the first 20 days of February were 46% ahead of those for the same period in 1935, despite the fact that the sales were hampered by inclement weather in all parts of the United States.

From February 1 to February 20 passenger car and truck sales totaled 3,652 as compared to 2,452 for the same period last year. From January 1 to February 20 this year sales totaled 9,604 or 38% above the same period last year when 6,962 units were sold.

A course of apprentice training, designed to provide competent skilled mechanics in two lines—tool and die making and automatic screw machine operation, has been instituted here by P. R. Mallory & Company, Indianapolis.

Ten apprentices, all graduates of Arsenal Technical High School's vocational school and recommended by vocational directors, have been selected for the three-year course. It was announced that the firm plans to take in annually as many as the shops can absorb, to safeguard the future, when it is expected that there will be a shortage of skilled mechanics, and to provide for the company's needs.

A new 1936 line of Cletrac crawler tractors was recently announced by the Cleveland Tractor Co., Cleveland, Ohio. Besides many improvements in construction, the line was expanded by the introduction of new models. Considerable retooling was necessary before the company got into production.

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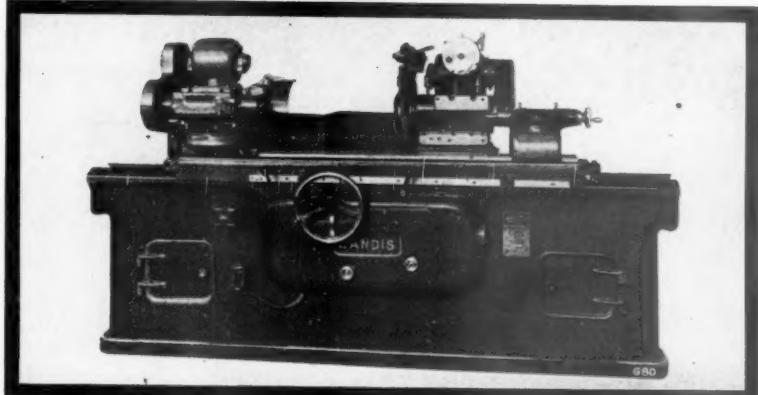
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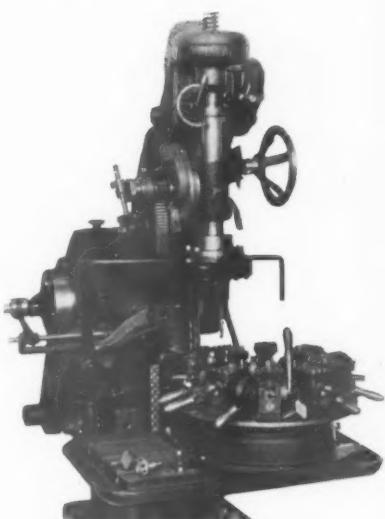
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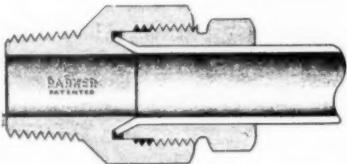
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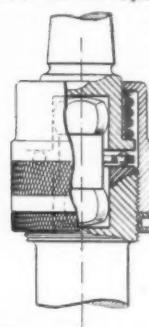
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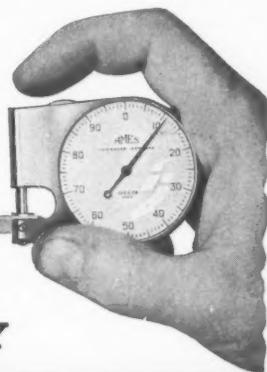
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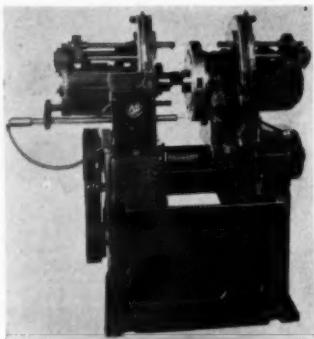
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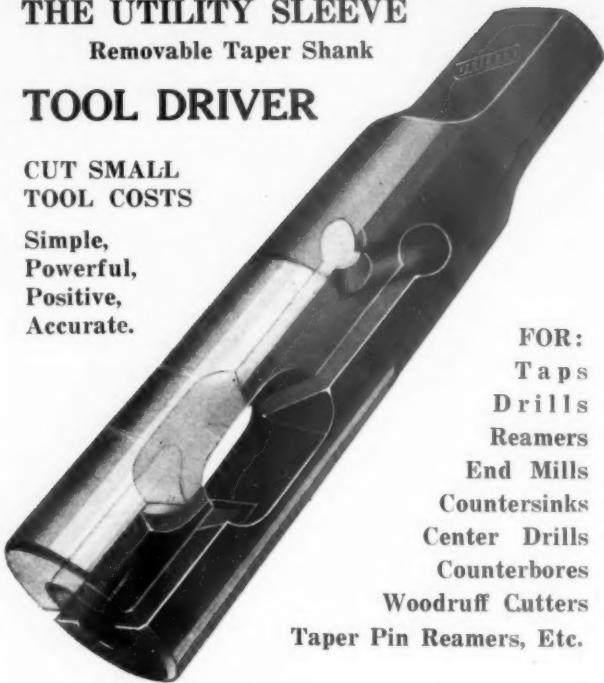
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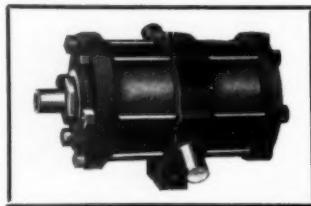
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